



LAND, MANGROVE AND FRESHWATER DECAPOD  
CRUSTACEANS OF MAYOTTE REGION  
(CRUSTACEA DECAPODA)

*Jean-Marie Bouchard, Joseph Poupin, Regis Cleva,  
Jacques Dumas and Vincent Dinhut*



Smithsonian Institution  
Scholarly Press

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# ATOLL RESEARCH BULLETIN

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**Atoll Research Bulletin No. 592 ♦ 23 October 2013**



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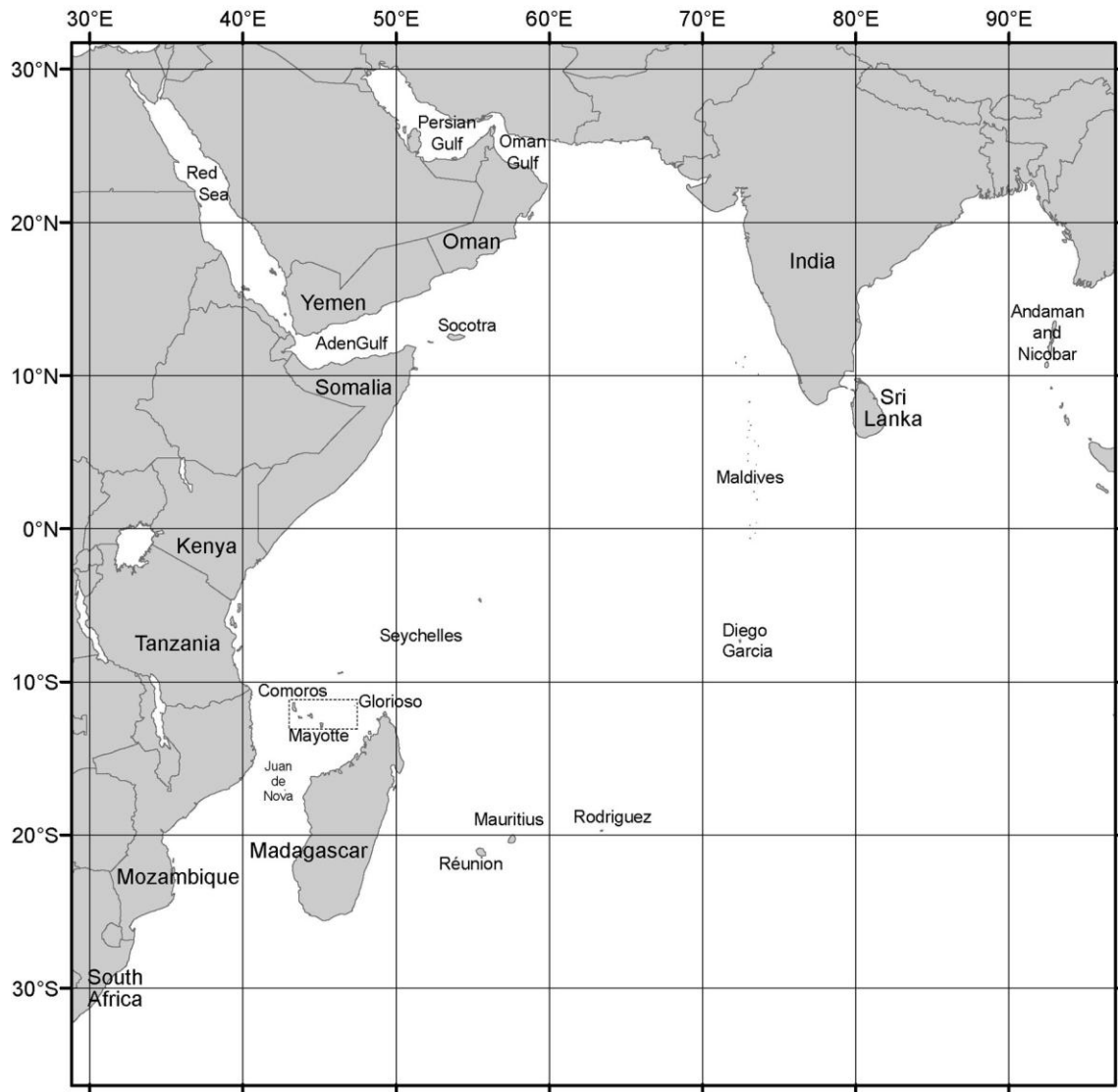
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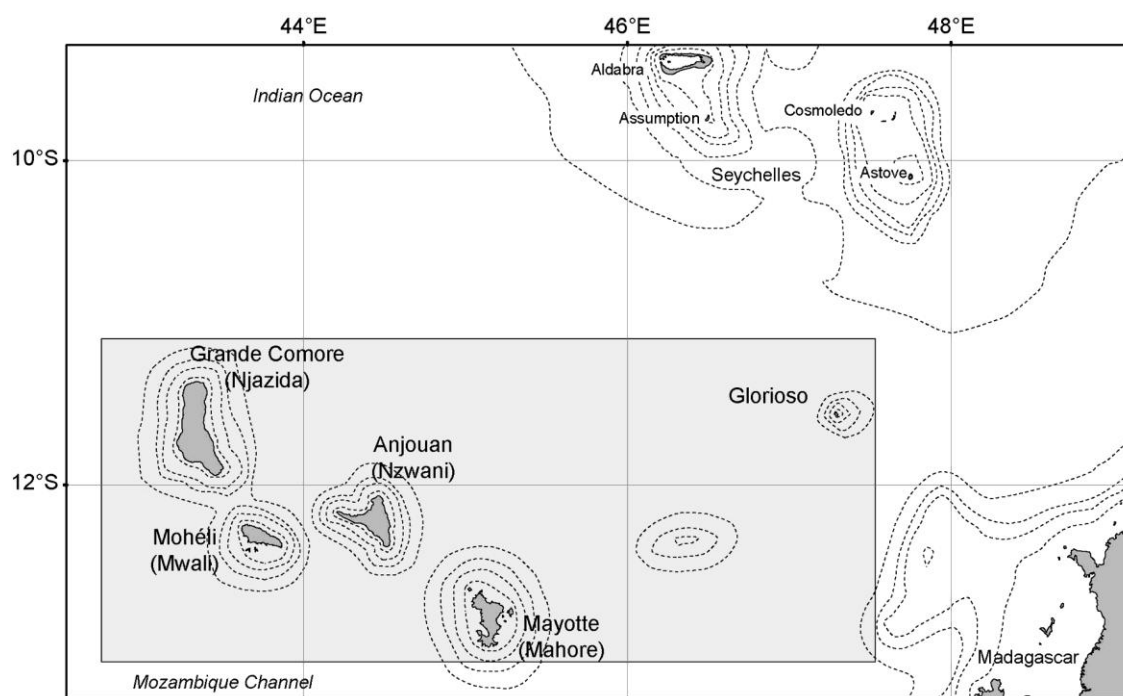
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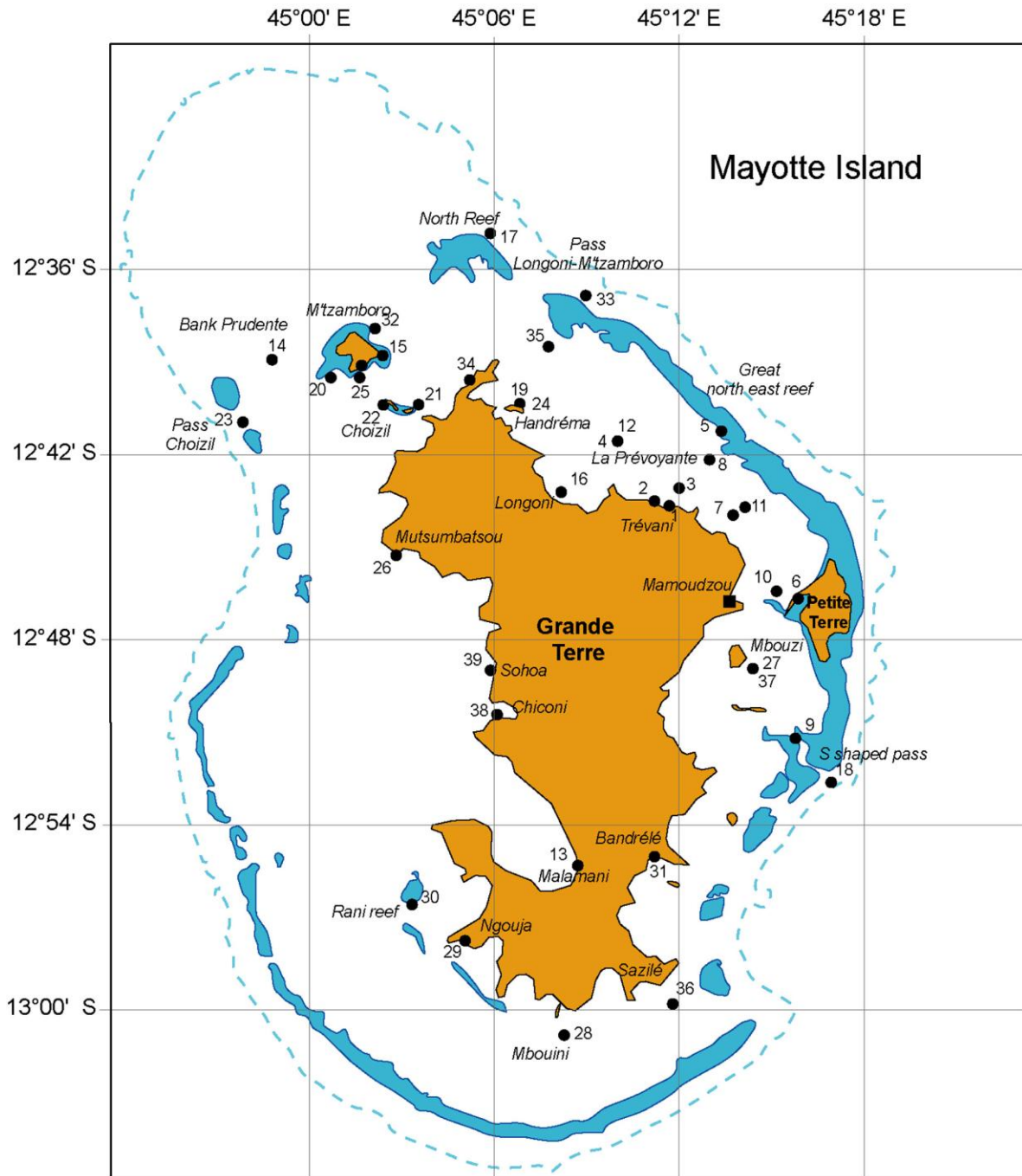
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**Figure 1.** Western Indian Ocean (WIO) with indication of Mayotte region (dotted rectangle)



**Figure 2.** ‘Mayotte region’ as defined for this study (grey rectangle). It includes Mayotte Island, the Comoros (Grande Comore, Mohéli, Anjouan), and the Glorioso Islands.



**Figure 3.** Map of Mayotte Island with places of collection (black dots).  
Details for stations 1-39 are in appendix 1.

**LAND, MANGROVE AND FRESHWATER  
DECAPOD CRUSTACEANS OF MAYOTTE REGION  
(CRUSTACEA DECAPODA)**

**BY**

**JEAN-MARIE BOUCHARD<sup>1</sup>, JOSEPH POUPIN<sup>2</sup>, REGIS CLEVA<sup>3</sup>,  
JACQUES DUMAS<sup>4</sup>, VINCENT DINHUT<sup>1</sup>**

**ABSTRACT**

A documented and illustrated checklist of land, mangrove and rivers Decapoda is proposed for Mayotte region. The study area is situated between longitudes 43-48° E and latitudes 11-13°10' S. It includes Mayotte Island, Comoros Islands, and Glorioso Islands. Records of the species are from a fieldwork at Mayotte in November 2009, complemented by a literature review. 58 species are listed including 24 new records for Mayotte region. The inventory includes 42 crabs, 11 shrimps and 5 coenobitids (*Birgus latro*, *Coenobita* spp.). Crabs Grapsoidea (*Cardisoma*, *Geograpsus*, *Grapsus*, *Metasesarma*, *Metopograpsus*, *Neosarmatium*, *Pachygrapsus*, *Parasesarma*, *Perisesarma*, *Pseudograpsus*, *Pseudohelice*, *Ptychognathus*, *Sesarmops*, *Thalassograpsus*, and *Varuna*) are best represented together with the Ocypodoidea (*Chaenostoma*, *Dotilla*, *Macrophthalmus*, *Ocypode*, and *Uca*). Shrimps belong to the genera *Atyoida*, *Caridina*, *Macrobrachium*, and *Palaemon*. Biotopes investigated include rivers, mangroves, estuaries, land, and coastal areas with a special attention paid to Malamani mangrove in the west coast of Mayotte Island. The fauna of Mayotte region is predominantly indo-west pacific in its composition (45 species). Thirteen species are distributed only in the western Indian Ocean, but only one is perhaps endemic to the region. A comparison with the fauna of the Seychelles Islands shows that at least 6 additional species, widely distributed in the Indo-West Pacific, are potentially also present in Mayotte region.

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## RESUME

Une liste documentée et illustrée des crustacés décapodes terrestres, de mangroves et de rivières est proposée pour la région de Mayotte. La zone étudiée est comprise entre les longitudes 43-48° E et les latitudes 11-13°10' S. Elle comprend l'île de Mayotte, l'archipel des Comores et les îles Glorieuses. Les signalements proviennent d'un atelier de terrain, réalisé à Mayotte en 2009, complétés par une recherche bibliographique. Au total 58 espèces sont identifiées dont 24 signalées pour la première fois à Mayotte. L'inventaire comprend 42 crabes, 11 crevettes et 5 cénobites (*Birgus latro*, *Coenobita* spp.). Les crabes Grapsoidea (*Cardisoma*, *Geograpsus*, *Grapsus*, *Metasesarma*, *Metopograpsus*, *Neosarmatium*, *Pachygrapsus*, *Parasesarma*, *Perisesarma*, *Pseudograpsus*, *Pseudohelice*, *Ptychognathus*, *Sesarmops*, *Thalassograpsus* et *Varuna*) sont les plus abondants, avec les Ocypodoidea (*Chaenostoma*, *Dotilla*, *Macrophthalmus*, *Ocypode* et *Uca*). Les crevettes appartiennent aux genres *Atyoida*, *Caridina*, *Macrobrachium* et *Palaemon*. Les biotopes échantillonnés sont les rivières, estuaires, mangroves, milieu terrestre et zone côtière, avec une attention particulière pour la mangrove de Malamani, dans l'ouest de l'île de Mayotte. La faune de Mayotte est majoritairement indo-ouest pacifique (45 espèces). Treize espèces ne sont distribuées que dans l'océan Indien occidental mais seulement une est peut-être endémique de la région. Une comparaison avec la faune des îles Seychelles montre qu'au moins 6 espèces supplémentaires, communes dans l'Indo-Ouest Pacifique, sont potentiellement présentes également dans la région de Mayotte.

## INTRODUCTION

This study is the first note of a series that intent to present the faunistic results obtained during the KUW 2009 fieldwork, organized in Mayotte Island, southwest Indian Ocean, November 1-21, 2009. This fieldwork has been prepared by first author with scientific partnership between the Institut de Recherche de l'Ecole Navale (IRENav), Brest, and the Muséum national d'Histoire naturelle (MNHN), Paris. Financial support was obtained through Mayotte Direction de l'Agriculture et de la Forêt (DAF) and Total Foundation. The objective of this KUW 2009 fieldwork was to establish the first documented inventory of the Crustacea Decapoda and Stomatopoda of Mayotte region.

A preliminary report of the results has been published just after the fieldwork but with limited diffusion and several provisional determinations (Bouchard *et al.*, 2009). Additional determinations have been made subsequently at IRENav and MNHN, complemented by a literature search of earlier investigations in Mayotte region, as defined in the 'Study area' section of this work and on figures 1 and 2. These regional records have been progressively integrated into a database posted on the Internet [1] and used as a collaborative tool to update, share and retrieve all the results of this project including stations data, maps, field observations, photographs, and associated literature.



To supplement this Internet portal a first publication is here proposed for the land, mangrove and freshwater species, the marine species being treated separately in forthcoming papers.

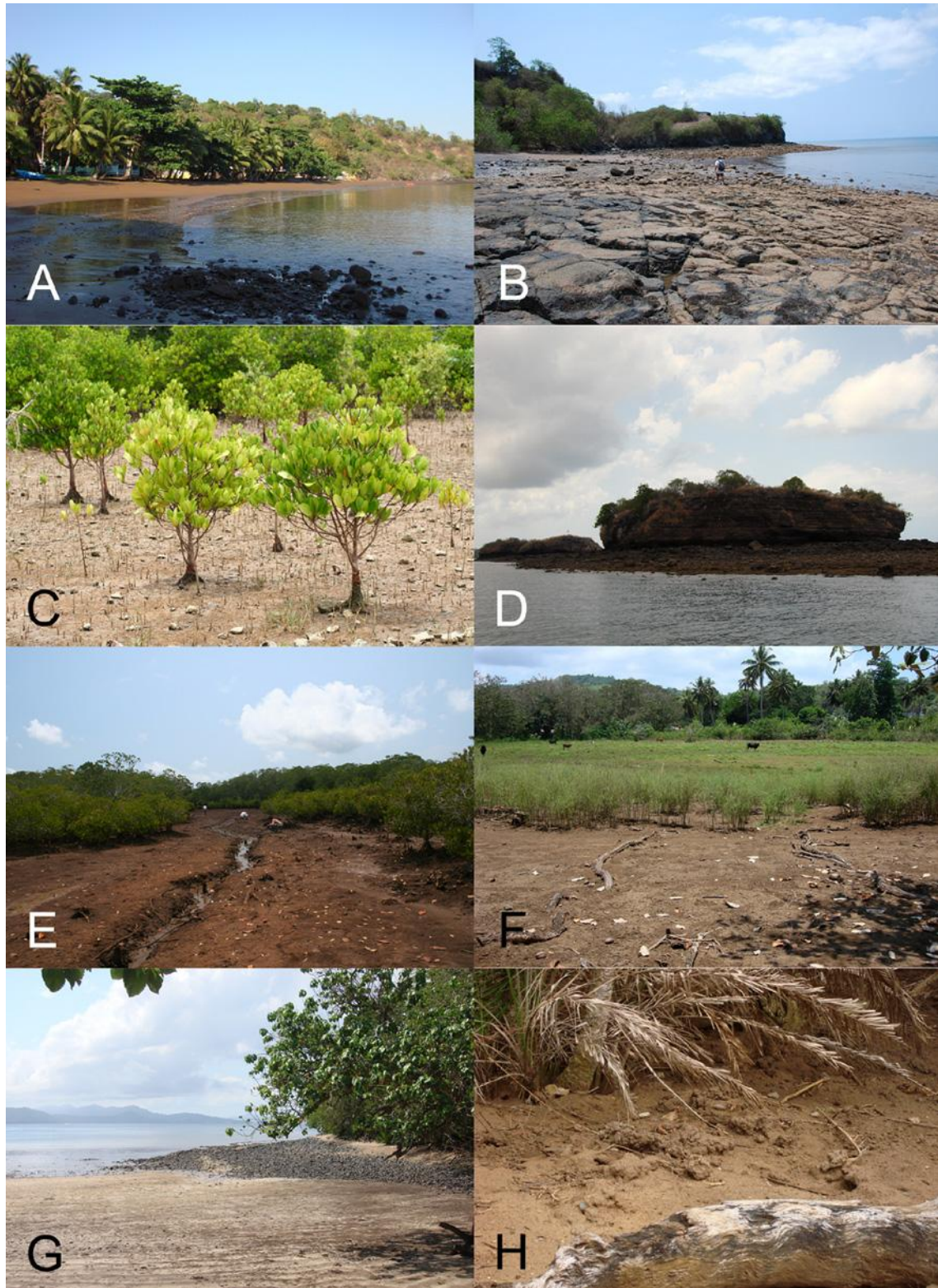
A short historical overview is presented before the documented checklist. Information for each species includes: taxonomic classification; list of specimens collected during the fieldwork (with MNHN catalog numbers), previous literature records in Mayotte region, geographic distribution and, if needed, additional comments. To facilitate the identification most of the species are illustrated by macro-photographs. The ecology and biogeography of this fauna is discussed at the end of the study.

Abbreviations used are: IWP, Indo-West Pacific; KUW, Kraken Underwater Works C<sup>ie</sup>, Mamoudzou, Mayotte; MNHN, Muséum national d'Histoire naturelle, Paris; UF, Florida Museum of Natural History, Gainesville; USNM, Smithsonian Institute, United States National Museum, Washington; WIO, Western Indian Ocean. For the shrimps the size is expressed as Lc, for carapace length, measured from the posterior margin of the orbit to the posterodorsal edge of the carapace, and Lt for total length, measured from tip of rostrum to tip of telson. For the hermit crabs Lc is the length of the shield (anterior part of the cephalothorax). For the crabs the size is expressed as carapace length×width.

## METHODS

### SAMPLING EVENTS

A total of 35 stations have been sampled in Mayotte and surroundings islets during the KUW 2009 fieldwork; collections made in few stations realized by the first author before this fieldwork (2007-2009) have been also added to the study. Overall 39 stations have been sampled (Fig. 3 and appendix 1), some of them several times, but only 16 were dedicated to land, mangrove, and coastal species (in bold in appendix 1). Photographs of few stations are on figure 4, including sandy-muddy shores (Figure 4A, G-H), rocky shores (Figure 4B, D) and mangroves (Figure 4C, E-F). A particular attention has been paid to Malamani mangrove in the west coast of Mayotte Island (station 13, Fig. 4E-F). On the contrary little attention has been paid to rivers because of a previous fieldwork already made in the Comoros to investigate the freshwater decapods (see Keith *et al.*, 2006).



**Figure 4.** Terrestrial biotopes visited during the K UW 2009 fieldwork: A) station 1, Trévani beach; B) station 2, coastline from Trévani to Kangani; C) station 6, mangrove near Badamiers spillway, Petite Terre; D) station 10, islet Quatre Frères (Vatou); E-F) station 13, Malamani mangrove; G) station 26, Mutsumbatsou upper beach at low tide; H) station 29, Ngouja hotel, Mboianatsa upper beach.

## STUDY AREA

The study area includes Mayotte Island, where the fieldwork was realized, plus the Comoros archipelago (Grande Comore or Njazida, Mohéli or Mwali, Anjouan or Nzwani) and the Glorioso Islands with records obtained from the scientific literature for these additional places.

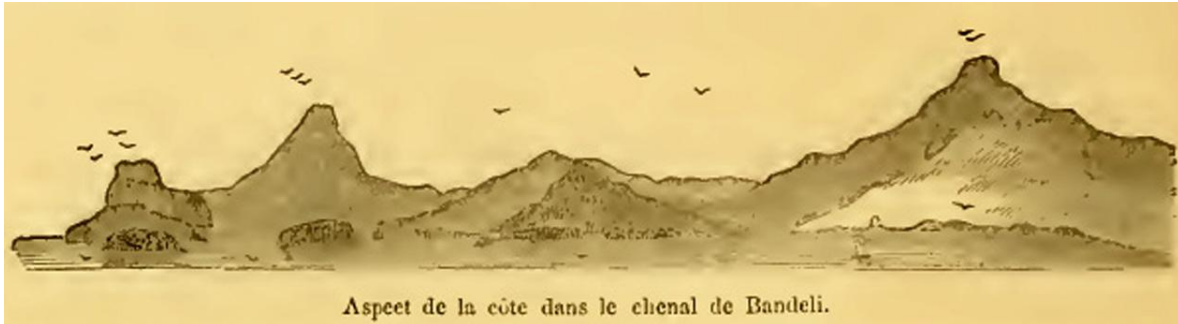
## TAXONOMIC REGISTER

The systematic classification used for this work is that of McLaughlin *et al.* (2010) for the Anomura and Ng *et al.* (2008) for the Brachyura (also available in WoRMS Internet database [2]). Valid names for the Caridea have been verified in a draft checklist of the shrimps of the world transmitted by De Grave & Fransen (in preparation).

## HISTORICAL OVERVIEW

Little attention has been paid up to now to terrestrial fauna of the Decapoda of Mayotte. The oldest record found during this research is in Hoffmann (1874). The specimens studied by Hoffmann have been collected by F. P. L. Pollen and D. C. Van Dam, as indicated by Pollen (1868) in his preface of the *‘Recherches sur la faune de Madagascar et de ses dépendances’*. In Pollen’s narration, chapter IV (p. 85) is dedicated to the sojourn in Mayotte Island in April-May 1864 (Figure 5). The major activity during the stay was dedicated to hunting parties in the main Islands, chiefly for collecting lemurs and birds with this indication by the ‘Commandant en chef’ of Mayotte (p. 87): *‘Jamais avant vous aucun naturaliste n’a exploré soigneusement les contrées de l’intérieur’*. The Decapoda are only briefly mentioned (p. 107) for mangrove crabs *Gecarcinus* and *Gelasimus* but obviously they were not collected since they do not appear in the subsequent study made by Hoffmann (1874). Marine decapods of the lagoon (*‘Calappidés, Paguridés et d’autres carabes’*) are also mentioned (p. 140) but these have not been collected too and Pollen complains (p. 139): *‘Hélas ! Le naturaliste ambulante ne peut pas satisfaire toujours à ses désirs de rassembler et d’étudier tout ce qu’il admire. Souvent il n’a que l’agréable souvenir des choses qu’il a observées, quelques lignes qu’il insère dans son journal de voyage, le dédommage du regret, qu’il éprouve de ne pouvoir emporter le fruit de ses recherches, par manque des fonds nécessaires ou à cause de l’embarras de l’emballage et du transport coûteux et difficile. Bien des fois il prend alors congé avec tristesse d’objets curieux, souhaitant revenir un jour chercher ce qu’il n’a pu emporter par des circonstances indépendantes de sa volonté.’* As a result only a few lots of land and mangrove decapods have been collected at Mayotte during Pollen’s expedition including *Coenobita rugosus*

(under *C. clypeatus*), *Macrobrachium lar* (under *Palaemon mayottensis*), and *Scylla serrata*.



**Figure 5.** Aspect of Mayotte Island from Bandéli channel (after, Pollen, 1868: 86)

A small collection of crabs from Mayotte is also available in Paris MNHN with specimens collected around 1880 by E. Marie ‘Commissaire’ of the French Navy. However, according to Guinot (1957) this collection contains only one Portunidae and 24 xanthid crabs, but no land or mangrove species.

In 1882 the British H.M.S. *Alert* put in the Glorioso Islands and the surgeon of the expedition, R. W. Coppinger (1884) mentions the presence in these Islands of the coconut crab, *Birgus latro*, a record thereafter confirmed by Miers (1884) in his study of the Crustacea of the expedition (see more comment in the Anomura section of the list). On their way from Glorioso to Mozambique, Coppinger (1884: 240) does mention Mayotte but without stay in the Island: ‘On the morning of the 8<sup>th</sup> of May we were again under way and sailing for Mozambique Island, which is about five hundred miles from Glorioso. On the evening of the 10<sup>th</sup> we passed within a few miles of Mayotta, one of the Comoro Islands, and had a fine view of its high volcanic hills,—a sight peculiarly grateful to eyes now for some time accustomed to seeing land only in the shape of low coral islands’.

During his 1903-1905 travel in East Africa, the German zoologist Alfred Voeltzkow has collected a few Crustacea in the Comoros Islands. These have been studied by Lenz (1910) with records of a few freshwater shrimps of the genus *Caridina* and mangrove crabs *Sesarmops impressus* (as *Sesarma nodulifera* de Man, 1892, see in Crosnier, 1965) and *Varuna litterata* (Fabricius, 1798).

In his contribution to the study of the fauna of Madagascar Alain Crosnier (1965) mentions a few species of grapsid and ghost crabs from Grande Comore, Mohéli, Mayotte and Glorioso Islands. Collection data for these records are not clearly indicated but according to a note in the introduction these come from reexamination of specimens collected by Pollen, Van Dam, and Voeltzkow in addition to ‘diverses récoltes faites aux Comores et aux Glorieuses’ deposited in the Muséum national d’Histoire naturelle, Paris (MNHN). It seems also that a few specimens come from Crosnier own sampling effort over

a period of several years while working at the Centre d'Océanographie et des Pêches (ORSTOM.), Nosy Be, Madagascar. For example, A. Crosnier was part of the 1959 ORSTOM Expedition to Mayotte on board the ship ORSTOM II. According to Guilcher *et al.* (1965) this campaign was mostly dedicated to the study of geomorphology, sedimentology, hydrology, and foraminifera but Crustacea samples are also indicated at several stations in the sampling table presented at the end of Guilcher *et al.* (1965) study.

Another marine biologist that has contributed to gather crustacean collections from Mayotte and the Comoros Island is Pierre Fourmanoir, ichthyologist at Nosy Be ORSTOM center for several years. He has published a study on the intertidal crustacean fauna of the Comoros (Fourmanoir, 1955) but with only marine species (lobsters, shrimps, hermit crabs, mantis shrimps) and no record of terrestrial or mangrove species.

Subsequent expeditions that have contributed to the study of the crustacean fauna of Mayotte region have been mostly dedicated to marine fauna. These are for example the ninth cruise of the R.V. “*Anton Bruun*” in 1964, with crustacean collections deposited in the Smithsonian Institution, Washington (see Bruce, 1967, 1971), or the BENTHEDI campaign in 1977 on board the R.V. “*Suroît*” with collections deposited in the MNHN and a brief presentation of this campaign made by Kornicker (1992) for his study on the Ostracoda of the campaign.

More recently, in 2008, two marine biologists Arthur Anker and François Michonneau have realized a short sojourn in Mayotte for the Florida Museum of Natural History (UF) with collections of several Crustacea including two land species: *Coenobita rugosus* H. Milne Edwards, 1837 and *Sesarmops impressus* (H. Milne Edwards, 1837).

## LIST OF THE SPECIES

Several records of this list have been already published in December 2009 in a preliminary report issued just after the KUW fieldwork (Bouchard *et al.*, 2009). Some misidentifications in this report are corrected here with this presentation: *Macrophthalmus (Macrophthalmus) grandidieri* A. Milne-Edwards, 1867 ... 1 ovigerous female 9.0×18.6 mm (MNHN B32077), as ‘*Macrophthalmus parvimanus*’ in Bouchard *et al.*, 2009: photo p. 89.

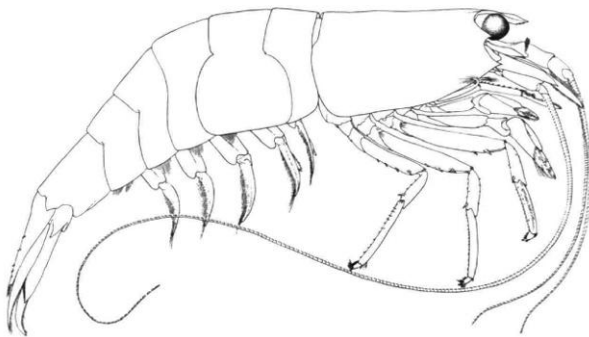
The present list has been also integrated in a more global compilation for the French overseas territories of the tropical Indo-Pacific (Poupin, 2010). It is also included in the Internet WoRMS database [2] under the geographic label ‘Mayotte Exclusive Economic Zone’ with the exception of a few freshwater shrimps pending a revised world checklist by S. De Grave and C. Fransen.

CLASS MALACOSTRACA  
SUBCLASS EUMALACOSTRACA  
ORDER DECAPODA  
INFRAORDER CARIDEA

The freshwater shrimps of the Comoros Islands have been recently inventoried by Keith *et al.* (2006). For that reason river stations were not made during the KUW 2009 fieldwork. Except for a few observations, the list below relies mostly on Keith *et al.* (2006) which can be consulted for more information such as determination keys, ecology, or color photographs of the species.

In addition to this list, Lenz (1910) has two additional records of *Caridina* shrimps from Comoros (Mohéli) with unclear taxonomic status. These are (p. 568) *Caridina nilotica* (Roux) var. *gracilipes* De Man (Mohéli) and (p. 569) *Caridina Weberi* var. *sumatrensis* De Man. These two records probably are *Caridina gracilipes* De Man, 1892, known with certainty from Indonesia, Taiwan, China, and Philippines, and *Caridina sumatrensis* De Man, 1892, known with certainty from Indonesia, Malaysia and Philippines (see Cai & Shokita, 2006 for distributions).

SUPERFAMILY ATYOIDEA  
FAMILY ATYIDAE



**Figure 6.** *Atyoida serrata* – Small-sized freshwater shrimp common in Comoros rivers. Drawing of a male specimen from La Réunion, carapace length 5.7 mm (from Chace, 1983: 21, fig. 11a).

***Atyoida serrata* (Bate, 1888).** Figure 6 – *Atyoida serrata* - Keith *et al.*, 2006: 35, 48 (Comoros: Anjouan, Mohéli, Mayotte).

Distribution. – WIO. Madagascar, Comoros, Seychelles, Réunion, Mauritius (see Chace, 1983: 20).

Comment. – Total length between 20-50 mm. Collected in rivers, up to an altitude of 1200 m. A color photograph is given by Keith *et al.* (2006: 49).

***Caridina brachydactyla* De Man, 1908** – *Caridina nilotica* var. *brachydactyla* De Man - Lenz, 1910: 568 (Comoros: Mohéli, Mayotte). - *Caridina brachydactyla* - Richard & Clark (2010: 317, references, distribution).

Distribution. – IWP. South Africa, Tanzania, Madagascar, ?Mayotte, Andaman Malaysia, Indonesia, New Caledonia.

Comment. – It is not clear in Richard & Clark (2010) if Lenz's specimens from Mohéli and Mayotte do belong to this species because Lenz's reference is indicated with the mention 'partim' and Comoros or Mayotte are not indicated in the distribution of the species.

***Caridina longirostris* H. Milne Edwards, 1837.** – *Caridina longirostris* - Keith *et al.*, 2006: 35, 50 (Comoros: Anjouan, Mohéli, Mayotte).

Distribution. – Widespread in the IWP. Eastern Africa, Madagascar, Comoros, Seychelles, Réunion, Mauritius, Indonesia, Philippines, New Caledonia, Fiji.

Comment. – Medium-sized shrimp, total length 35 mm. A color photograph is given by Keith *et al.* (2006: 51) with mention of a distinctive oblique red-carmine band on the cephalothorax.

***Caridina serratiostris* De Man, 1892.** – *Caridina serratiostris* - Keith *et al.*, 2006: 35, 56 (Comoros: Mohéli).

Distribution. – Widespread in the IWP. Madagascar, Comoros, Seychelles, Réunion, Mauritius to Indonesia, Japan, Philippines, northeastern Australia, New Caledonia, Wallis & Futuna, French Polynesia.

Comment. – Small freshwater shrimp with total length between 10-20 mm. It is characterized by numerous spines on the dorsal margin of the rostrum. It occurs in fresh and brackish waters in lower part of rivers or in estuaries. A color photograph is given by Keith *et al.* (2006: 58).

***Caridina typus* H. Milne Edwards, 1837.** – *Caridina typus* - Lenz, 1910: 570 (Mayotte). - Keith *et al.*, 2006: 36, 62 (Comoros: Anjouan, Mohéli, Mayotte).

Distribution. – Widespread in the IWP. Eastern Africa, Madagascar, Comoros, Seychelles, Réunion, Mauritius to Indonesia, Japan, Philippines, Australia, New Caledonia, Wallis & Futuna.

Comment. – Medium-sized shrimp, total length 45 mm. A color photograph is given by Keith *et al.* (2006: 62).

## SUPERFAMILY PALAEMONOIDEA

### FAMILY PALAEMONIDAE

***Macrobrachium australe* (Guérin-Méneville, 1838).** – *Macrobrachium australe* - Keith *et al.*, 2006: 36, 58 (Comoros: Anjouan, Mohéli, Mayotte). - KUW fieldwork November 2009, St. 13, Malamani mangrove, 1 female Lc 8.0 mm, det. X. Li (MNHN Na17579).

Distribution. – Widespread in the IWP. Madagascar, Comoros, Seychelles, Réunion, Mauritius to Indonesia, Taiwan, Philippines, Papua New Guinea, New Caledonia, Wallis & Futuna, French Polynesia. Despite its wide distribution it seems that all former records *M. australe* in Australia are not founded and that this shrimp does not occur there (Short, 2004: 18).

Comment. – Medium-sized shrimp with Lt between 60-90 mm. It lives in the lower course of rivers and in brackish waters of estuaries and mangroves. Fresh specimens can be recognized by the presence of 2-3, usually 3, oblique brown bands on the lateral faces of the cephalothorax. A color photograph is given by Keith *et al.* (2006: 69).

***Macrobrachium equidens* (Dana, 1852).** – *Macrobrachium equidens* - Keith *et al.*, 2006: 36, 70 (Comoros: Mayotte).

Distribution. – Widespread in the IWP. Eastern Africa, Mayotte, Seychelles, India, Indonesia, Malaysia, Singapore, Southern China, Taiwan, Philippines, Australia, Papua New Guinea, Salomon, New Caledonia, Fiji.

Comment. – Medium-sized shrimp with Lt between 70-115 mm. It lives in brackish waters of estuaries and mangroves. On figure 7 the specimen photographed by J.-B. Nicet in a mangrove of Mayotte most probably belongs to this species. A color photograph is also given in Keith *et al.* (2006: 71).



**Figure 7.** *Macrobrachium ?equidens* – Specimen not examined, collected in a mangrove of Mayotte by J.-B. Nicet after KUW fieldwork. Probably *M. equidens*, based on place of collection and color pattern.

***Macrobrachium lar* (Fabricius, 1798).** – *Palaemon mayottensis* Hoffmann, 1874: 32, pl. IX, fig. 61, 62 (Mayotte; *P. mayottensis* Hoffmann is a synonym of *Macrobrachium lar*). - *Palaemon (Eupalaemon) lar* - Lenz, 1910: 567 (Comoros, Mohéli). - Roux, 1934: 546 (Mayotte, 5 males coll. Humblot, MNHN). - *Macrobrachium lar* - Keith *et al.*, 2006: 36, 76 (Comoros: Anjouan, Mohéli, Mayotte).

Distribution. – Widespread in the IWP. Eastern Africa, Madagascar, Comoros, Seychelles, Réunion, Mauritius, India, Indonesia, Taiwan, Japan, Philippines, Australia, Papua New Guinea, Salomon, New Caledonia, Fiji, Wallis & Futuna, French Polynesia.

Comment. – One of the largest *Macrobrachium* with Lt between 160-200 mm or 300-350 mm if length of the chelae is included. Common in lower course of rivers. A color photograph is given by Keith *et al.* (2006: 77)

***Macrobrachium lepidactylus* (Hilgendorf, 1879).** – *Macrobrachium lepidactylus* - Keith *et al.*, 2006: 36, 78 (Comoros: Mohéli, Mayotte).

Distribution. – WIO. Kenya, Mozambique, South Africa, Madagascar, Comoros, Réunion, Mauritius.

Comment. – Medium-sized shrimp with Lt between 80-100 mm. Collected in median and lower parts of rivers. A color photograph is given by Keith *et al.* (2006: 79).

***Palaemon concinnus* Dana, 1852.** – *Palaemon concinnus* - Keith *et al.*, 2006: 36, 64 (Comoros: Mohéli, Mayotte).

Distribution. – Widespread in the IWP. Red Sea, Eastern Africa, Madagascar, Comoros, Seychelles, Réunion, Mauritius, Indonesia, South China Sea, Japan, Philippines, Australia, New Caledonia, Wallis & Futuna, Marshall Islands, Fiji, French Polynesia.

Comment. – Medium-sized shrimp with Lt between 60-65 mm. Body translucent with a black spot near the tail. Lives in brackish waters of estuaries. A color photograph is given by Keith *et al.* (2006: 65).

***Palaemon debilis* Dana, 1852.** – *Palaemon debilis* - Keith *et al.*, 2006: 36, 66 (Comoros: Mayotte). - Malamani mangrove, coll. J.-M. Bouchard, 16 April 2008, 1 ovigerous female, Lc 5.5 mm (MNHN Na16056), det. X. Li; KUW fieldwork November 2009, St. 13, Malamani mangrove, 1 ovigerous female Lc 5.0 mm (MNHN Na16052), det. X. Li.

Distribution. – Widespread in the IWP. Gulf of Suez to Hawaii and French Polynesia, including Eastern Africa, Mayotte, Seychelles, Indonesia, Japan, Philippines, Australia, New Caledonia, Wallis & Futuna.

Comment. – Small-sized shrimp with Lt between 30-35 mm; lives in brackish to marine waters in estuaries, mangroves and along the coast.



INFRAORDER ANOMURA  
SUPERFAMILY PAGUROIDEA

The following list is limited to the coenobitids although a few others coastal hermit crabs collected during the KUW fieldwork, such as *Clibanarius longitarsus* (De Haan, 1849), are sometimes associated with mangroves and could have been therefore listed here. These will be included in a forthcoming list of marine species.

FAMILY COENOBITIDAE

A key of the WIO coenobitids, including the five species presented here, is available in Reay & Haig (1990).



**Figure 8.** A) *Birgus latro* from Glorioso; photo 2/12/2010 by legionnaire G. Pérez, stationed on the island. B-C) *Coenobita brevimanus*. Specimens photographed at Wallis & Futuna in shell of the giant African snail *Achatina fulica* (see Poupin & Juncker, 2008). The characteristic sub-cylindrical eyestalks of this species are clearly visible on these photographs.

***Birgus latro* (Linnaeus, 1767).** Figure 8 A. – *Birgus latro* - Coppinger, 1884: 237-238 ('Du Lise Island', Glorioso, H.M.S. *Alert* Expedition). – Miers, 1884: 555 (same specimen, Glorioso, coll. H.M.S. *Alert*, one adult female in the British Museum collections). – Jean Hivert and Erwan Lagadec. field observation, April 2011 (Glorioso and also Juan de Nova in the Mozambique channel).

Distribution. – IWP (see Drew *et al.*, 2010: 47, fig. 1). ?Eastern Africa, Juan de Nova, Glorioso, ?Madagascar, Seychelles, Chagos, Christmas, Loyalty, Salomon, Fiji, Wallis & Futuna, French Polynesia.

Comment. – The coconut crab *Birgus latro* has neither been seen nor reported during inquiries made during the K UW fieldwork at Mayotte. However, its presence can be confirmed for this work in the Glorioso Islands, based on a personal communication by Jean Hivert after a short stay on the island in April 2011 and photograph transmitted by G. Pérez (see Fig. 8 A.) The record of *Birgus latro* in eastern Africa (Reay & Haig, 1990: 583, table 3, after Reyne, 1939) is quite old and it is doubtful that this big species still survives in Tanzania. The origin of the Malagasy record in Reay & Haig (1990) has not been identified. It is perhaps a mistake for Glorioso Islands in the North of Madagascar. According to the carcinologist Alain Crosnier (pers. com.), who made two stays (1958-1962 and 1970-1975) in Nosy Be, Madagascar, during his scientific career, the presence of *Birgus latro* was never confirmed at that time and his colleague, the ichthyologist Pierre Fourmanoir, has never found it despite intensive search between 1955-1958 in the islets bordering the northern coast of Madagascar. A confirmed place of extinction in the WIO is Mauritius where the coconut crab was still present in 1836, reported by Darwin (1909: 489) in his '*Voyage of the Beagle*', but already with this comment '*It formerly abounded at Mauritius, but only a few small ones are now found there*'.

***Coenobita brevimanus* Dana, 1852.** Figure 8 B-C. – *Coenobita brevimanus* - Vuillemin, 1970: 235 (East coast of Grande Comore, abundant).

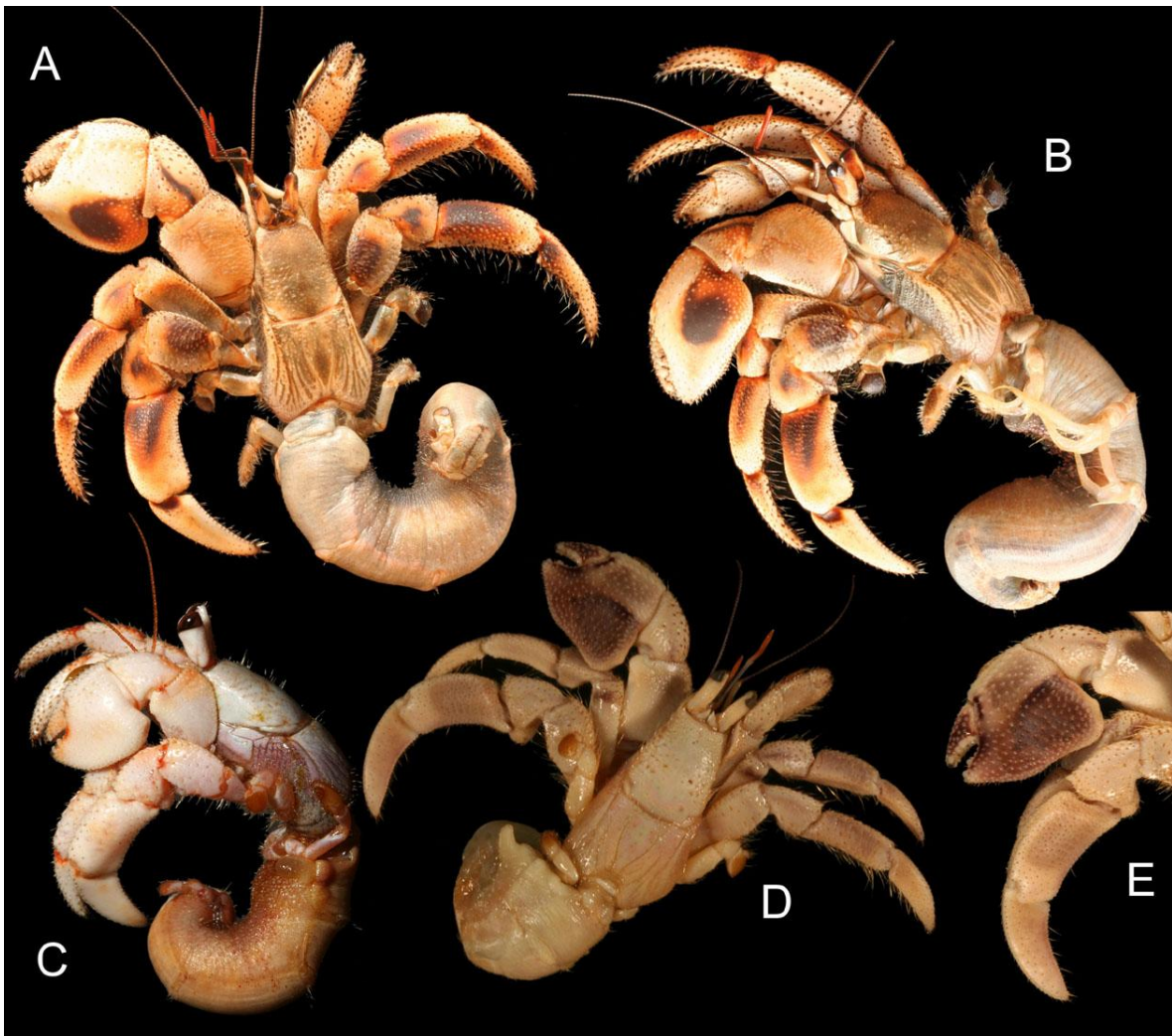
Distribution. – IWP. Tanzania, Madagascar, Comoros, Seychelles, Christmas and Cocos, Taiwan, Japan, Line Islands, Papua New-Guinea, Solomon, New Caledonia, Loyalty, Vanuatu, Wallis & Futuna, Fiji, Samoa, Cook, French Polynesia.

Comment. – *Coenobita brevimanus* can be easily recognized by its eyestalks, sub-circular instead of strongly compressed laterally in all other species of coenobitids (see Fig. 8). It is included here based on Vuillemin (1970) record but it has still not been reported formally from Mayotte. In Grande Comore Vuillemin (1970: 235) states that it is very abundant on West coast with this comment: "*Dans ce dernier biotope, au cours de l'été austral, en décembre notamment, vers 22 heures, des centaines de Cénobites traversent la route de Moroni à Mitsamiouli, les uns allant à la mer, les autres en revenant. Leurs coquilles craquent sous les roues des autos qui circulent ...*" Amazingly, Vuillemin also observes that this cenobite kills the big giant African snail, *Achatina fulica*, to use its shell as a shelter.

***Coenobita cavipes* Stimpson, 1858.** Figure 9 A-B. – K UW fieldwork November 2009, St. 1, Trévani beach, supralittoral zone, in shell of *Achatina* sp., 2 females Lc 11.3-12.0 mm, cephalothorax 22.0-22.4 mm, Lt about 85-102 mm, as '*Coenobita rugosus*' in Bouchard *et al.* 2009: 95, photo (MNHN Pg8453); St. 6, Badamiers spillway, Petite Terre, supralittoral zone, 1 female Lc 5.6 mm, cephalothorax 12 mm, Lt about 34 mm, as '*Coenobita* sp.' in Bouchard *et al.* 2009: 95, photo (MNHN Pg8454).

Distribution. – Widespread in the IWP. Somalia, Kenya, Tanzania, Mozambique, South Africa, Madagascar, Mayotte (first record), Seychelles, India, Vietnam, Malaysia, Japan to French Polynesia.

Comment. – This species has been sometimes considered as a junior synonym of *Coenobita violascens* Heller, 1862, described from Nicobar Islands, Eastern Indian Ocean (see Fize & Serène, 1955). Although both species are now considered valid they are closely related and characters used to distinguish them are in need of revision. Mayotte specimens are tentatively attributed to *C. cavipes* on the basis of key characters given by Nakasone (1988) and previous WIO records: Somalia (Vannini, 1976), Kenya (Reay & Haig, 1990) and Seychelles (Haig, 1984). In *Coenobita cavipes* the upper outer surface of the left chela is without stridulating mechanism (*i.e.* an oblique series of laminar crests), a character that can be used to distinguish it from the two other *Coenobita* collected in Mayotte, *C. perlatus* and *C. rugosus* both with this stridulating mechanism.



**Figure 9.** A-B) *Coenobita cavipes*, Mayotte, KUW St. 1, Trévani beach, supralittoral zone, 1 female Lc 12 mm, Lt about 102 mm (MNHN Pg8453); C) *Coenobita perlatus*, KUW St. 10, islet Quatre Frères (Vatou) 1 female juvenile Lc 7.1 mm, cephalothorax 12.6 mm, Lt about 35 mm (MNHN Pg8455); D-E) *Coenobita rugosus*, St. 19, islet Handrema, littoral, 1 male Lc 6.7 mm, Lt about 27 mm. Color slightly altered by preservative (MNHN Pg8457).

*Coenobita perlatus* **H. Milne Edwards, 1837.** Figure 9 C. – KUW fieldwork November 2009, St. 10, islet Quatre Frères (Vatou) 1 female juvenile Lc 7.1 mm, cephalothorax 12.6 mm, Lt about 35 mm, as ‘*Coenobita* sp.’ in Bouchard *et al.* 2009: 95, photo (MNHN Pg8455); St. 21a, islet Choizil, ?1 ovigerous female Lc 22 mm, Lt about 50 mm, as ‘*Coenobita* aff. *perlatus*’ in Bouchard *et al.* 2009: 95, photo (MNHN Pg8456).

Distribution. – Widespread in the IWP. Tanzania, Madagascar, Mayotte (first record), Seychelles, Mauritius to Great Barrier Reef, Chesterfield, Loyalty, Vanuatu, Salomon, Wallis & Futuna, Fiji, Samoa, Cook, French Polynesia.

Comment. – This species is usually found along coral beaches. In Mayotte it was collected only on the islets surrounding the main Island. Ovigerous female Lt about 50 mm (MNHN Pg8456) is tentatively attributed to this species. It has not the bright red coloration typical of adult specimens of *C. perlatus* and resembles *C. rugosus* for the angular aspect of its big chela, at proximal lower margin. It has been compared with a specimen of *Coenobita rugosus* of the same size, from French Polynesia. Both specimens have in common a stridulating mechanism on the upper outer surface of the left chela. The specimen from Mayotte, tentatively attributed here to *Coenobita perlatus*, is different by: bead-shaped tubercles on outer face of left chela (outer face almost smooth in *C. rugosus*); no dark rounded patch of variable extension on lower half of outer face of left chela (present in *C. rugosus*); propodus of left third pereopod with outer surface convex connected to upper surface by rounded margin (outer surface flat separated from upper surface by a sharp ridge in *C. rugosus*).

***Coenobita rugosus* H. Milne Edwards, 1837.** Figure 9 D-E. – *Coenobita clypeatus* Milne Edwards - Hoffmann, 1874: 29 (Mayotte) non *C. clypeatus* (Fabricius, 1787) an Atlantic species. - *Coenobita rugosus* – Coll. Anker & Michonneau, 2008, St. MAY08-St7, N'Gouja, latitude 12.964231 S, longitude 45.086434 E (UF 13655). - KUW fieldwork November 2009, St. 19, islet Handrema, littoral, coll. Lisa Bouchard, 2 males Lc 6.7-7.3 mm, Lt about 27-31 mm, 3 females Lc 5.6-6.7 mm, Lt about 24-32 mm, 2 specimens in shells (MNHN Pg8457).

Distribution. – Widespread in the IWP. Somalia, Kenya, Tanzania, Mozambique, Madagascar, Mayotte, Seychelles, Réunion, Mauritius to Taiwan, Japan, Loyalty, Vanuatu, Solomon, Wallis & Futuna, Samoa, Tonga, Cook, Line Islands, French Polynesia.

Comment. – A dark, more or less round, patch on proximal lower half of outer face of left chela is characteristic of this species. However, the background color of *C. rugosus* can be variable according to McLaughlin *et al.* (2007), cream, purplish, bluish-gray, dark blue, or mixture of these colors.

#### INFRAORDER BRACHYURA

#### SUPERFAMILY ERIPHIOIDEA

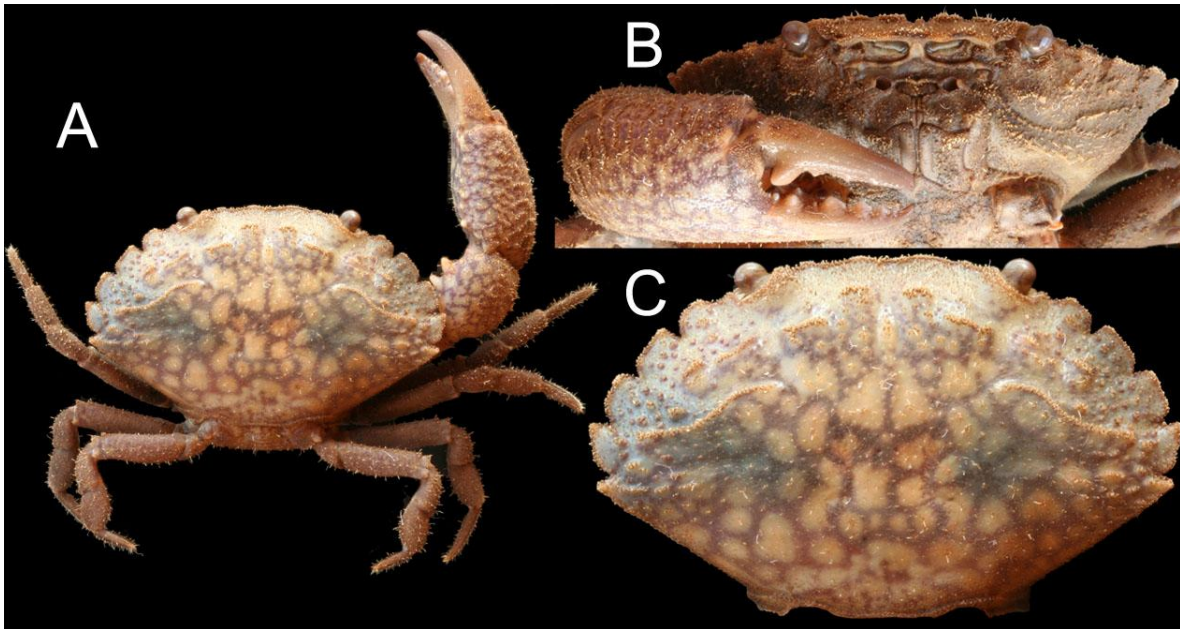
#### FAMILY OZIIDAE

*Epixanthus dentatus* is the single crab of this family included in this list because it is a common inhabitant of the mangroves reported for example in Kenya (Cannicci *et al.*, 1998) or Papua Indonesia (Rahayu & Setyadi, 2009). Two additional *Epixanthus* crabs, *E. frontalis* (H. Milne Edwards, 1834) and *E. corrosus* A. Milne-Edwards, 1873, were also collected during the KUW fieldwork. They live in the intertidal and will be presented in the forthcoming list of marine species.

***Epixanthus dentatus* (White, 1848).** Figure 10. – KUW fieldwork November 2009, St. 13, Malamani mangrove 1 male 17.8×29 mm as 'Xanthidae indéterminé' in Bouchard *et al.*, 2009, photo p. 83 (MNHN B32465).

Distribution. – IWP. Kenya, Madagascar, Mayotte (first record), Seychelles, Nicobar, Mergui, Andaman, Indonesia, Australia, Singapore, Taiwan, Japan, Philippines, Fiji.

Comment. – A crab commonly reported in mangrove areas. A single specimen has been collected during this fieldwork probably because it is nocturnal and that no visit has been paid at night to the mangroves. The basal tooth, visible on the single chela left on the specimen captured, is adapted to break mollusks' shells.



**Figure 10.** *Epixanthus dentatus*. Mayotte, KUW 2009 fieldwork, St. 13, Malamani mangrove 1 male 17.8×29 mm (MNHN B32465), A) Dorsal view (left chela missing), B) Frontal view, C) Detail of carapace.

## SUPERFAMILY PORTUNOIDEA

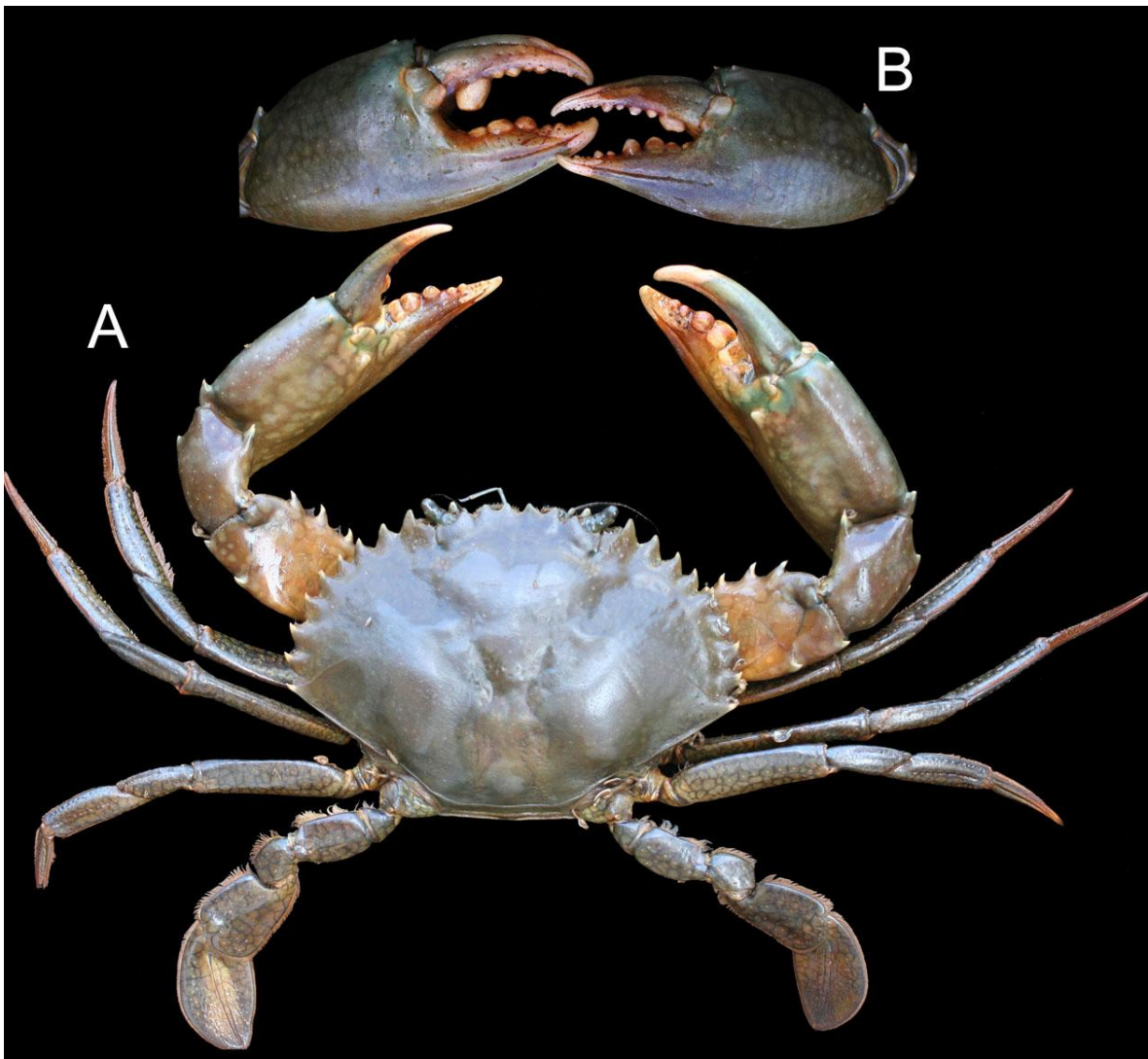
### FAMILY PORTUNIDAE

The large-sized mud-crab, caught at low tide in Malamani mangrove, is the single portunid crab of this list. In addition, several other portunid crabs have been caught during the KUW fieldwork in the intertidal or when using traps in muddy bays of the lagoon. These will be integrated in a list of marine species although some of them are sometimes considered as ‘mangrove species’, such as *Charybdis anisodon* (De Haan, 1850), *C. feriata* (Linnaeus, 1758), *C. hellerii* (A. Milne-Edwards, 1867), *Portunus sanguinolentus* (Herbst, 1783), *Thalamita crenata* Rüppell, 1830, *T. foresti* Crosnier, 1962, and *T. prymna* (Herbst, 1803).

***Scylla serrata* (Forskål, 1775).** Figure 11. – *Scylla serrata* - Hoffmann, 1874: 9 (Mayotte). - Guinot, 1967: 258 (Checklist of WIO species, with mention of Comoros, Mohéli, Anjouan, Mayotte). - Bouchard, 2009: 6, 7, Malamani mangrove, specimens re-examined for KUW fieldwork, St. J.-M. Bouchard n° 3, coll. J.-M. Bouchard 16 June 2008, 12°55.415 S, 44°09.275 E, mudflat between mangrove trees in deep burrow close to a stream, 1 female 70x100 mm (MNHN); coll. J.-M. Bouchard 8 October 2008, 1 male 93.6×140 mm (KUW), 1 smaller specimen not measured (MNHN). - KUW fieldwork November 2009, St. 2, Kangani mangrove, in situ observation only, specimen not collected.

Distribution. – IWP. Red Sea, Kenya, Tanzania, Mozambique, Madagascar, Comoros, Seychelles, Réunion, Mauritius, Indonesia, Taiwan, China, Japan, Philippines, Australia, New Zealand, New-Caledonia, Fiji, Wallis & Futuna, Samoa, Cook, French Polynesia, Hawaii.

Comment. – *Scylla serrata* is the commonest species in a complex that includes four sibling species. These four species are clearly identified in Keenan *et al.* (1998) revision of the genus *Scylla*. Currently, *Scylla serrata* is the only species of the complex reported in the southern part of the WIO (Mozambique channel, Madagascar). It is characterized by sharp frontal lobes and by the presence of two spines (reduced in the biggest specimens) on distal half of outer margin of the carpus of chelipeds. This is a large-sized crab, prized as food and captured in mangroves at low tide.



**Figure 11.** *Scylla serrata*. Mayotte, Malamani mangrove, coll. J.-M. Bouchard, 1 male 93.6×140 mm, color slightly altered by preservative, kept by KUW/Mayotte, not brought back to MNHN because of its large size, A) Dorsal view, B) Aspect of chelae, frontal view.